Punyashlok Ahilyadevi Holkar Solapur University, Solapur

NAAC Accredited-2022
'B^{++}'Grade (CGPA 2.96)

Name of the Faculty: Science &Technology

Syllabus: Geoinformatics

Name of the Course: PET Syllabus

(Syllabus to be implemented from June 2024)

GEOINFORMATICS
PET SYLLABUS

UNIT 1- Engineering Mathematics - Surveying measurements, Accuracy, Precision, Most probable value, Errors and their adjustments, Regression analysis, Correlation coefficient, Least squareadjustment, Statistical significant value, Chi square test.

Remote Sensing - Basic concept, Electromagnetic spectrum, Spectral signature, Resolutions- Spectral. Spatial, Temporal and Radiometric, Platforms and Sensors, Remote Sensing Data Products - PAN, Multispectral, Microwave, Thermal, Hyperspectral, Visual and digital interpretation methods

UNIT-2 - GNSS - Principle used, Components of GNSS, Data collection methods, DGPS, Errors in observations and corrections.

GIS - Introduction, Data Sources, Data Models and Data Structures, Algorithms, DBMS, Creation of Databases (spatial and non-spatial), Spatial analysis - Interpolation, Buffer, Overlay, Terrain Modeling and Network analysis.

UNIT- 3 - Maps - Importance of maps to engineering projects, Types of maps, Scales and uses, Plotting accuracy, Map sheet numbering, Coordinate systems- Cartesian and geographical, map projections, map datum – MSL, Geoid, spheroid, WGS-84.

Land Surveying - Various Levels, Levelling methods, Compass, Theodolite and Total Station and their uses, Tachometer, Trigonometric levelling, Traversing, Triangulation and Trilateration. Aerial Photogrammetry - Types of photographs, Flying height and scale, Relief (height) displacement, Stereoscopy, 3-D Model, Height determination using Parallax Bar, Digital Elevation Model (DEM), Slope.

UNIT – 4 - Data Quantization and Processing **-** Sampling and quantization theory, Principle of LinearSystem, Convolution, Continuous and Discrete Fourier Transform. Digital Image Processing - Digital image characteristics: image histogram and scattergram and their significance, Variance-Covariance matrix, Correlation matrix and their significance. Radiometric and Geometric Corrections – Registration and Resampling techniques. Image Enhancement – Contrast Enhancement: Linear and Non-linear methods; SpatialEnhancement: Noise and Spatial filters Image Transformation – Principal Component Analysis (PCA), Discriminant Analysis, Colortransformations (RGB - IHS, CMYK), Indices (Ratios, NDVI, NDWI).Image Segmentation and Classification – Simple techniques.

Unit 5 : Remote Sensing and GIS:

Elements of photogrammetry, elements of photo-interpretation, electromagnetic spectrum, emission range, film and imagery, sensors, geological interpretations of air photos and imageries. Global positioning systems. Application of Remote sensing techniques in Earth Sciences.